POWER TEAM
HYDRAULIC TECHNOLOGIES
Hydraulic Technologies
5885 11th Street
Rockford, IL 61109-3699 USA
Tech. Services: (800) 477-8326
Fax: (800) 765-8326
Order Entry: (800) 541-1418
Fax: (800) 288-7031
Internet Address:
http://www.powerteam.com

Form No. 102630

Operating Instructions for:

100174

MODELS D, F, & G

AIR HYDRAULIC PUMP

with Manifold

Rated Capacity: 2,500 PSI at 100 PSI Air

NOTE:

- **Carefully inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment.**
- **These instructions should be read and carefully followed. Most problems with new equipment are caused by improper operation or installation.**

PUMP FEATURES

Before operating or connecting this pump to clamps or cylinders, familiarize yourself with the operating controls, line connections and their functions. Refer to Figure 1 at right for this information.

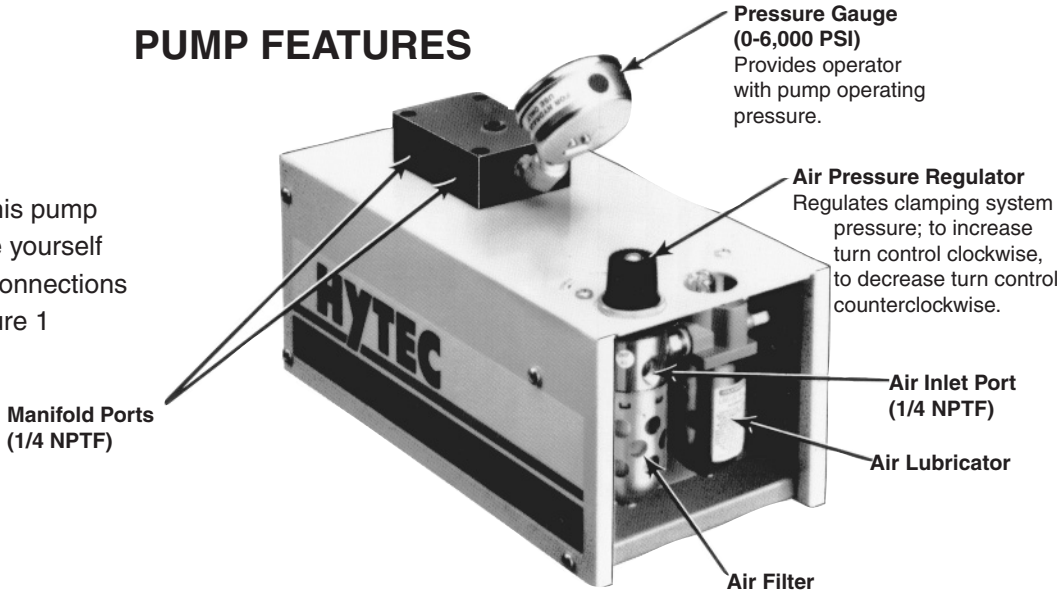


FIGURE 1

SAFETY PRECAUTIONS

WARNING:

- **All WARNING statements must be carefully observed to help prevent personal injury.**

Hydraulic Hose

- **Before operating the pump, tighten all hose connections using the proper tools. Do not overtighten the connections. Connections need only be tightened securely and leak-free. Overtightening may cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.**
- **Should a hydraulic hose ever burst, rupture, or need to be disconnected, immediately shut off the pump. Never attempt to grasp a leaking hose under pressure with your hands. The force of the escaping hydraulic fluid could cause serious injury.**

Note: Shaded areas reflect last revision(s) made to this form.

Litho in USA

⚠ WARNING cont'd

- **Do not subject the hose to potential hazard such as fire, extreme heat or cold, sharp surfaces, or heavy impact. Do not allow the hose to kink, twist, curl or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for signs of wear because any of these conditions can damage the hose and may result in personal injury.**
- **Do not use the hose to move attached equipment. Stress may damage the hose and cause personal injury.**
- **Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials may result in personal injury.**

Pump

- **Do not exceed 125 PSI air inlet pressure or 3125 PSI hydraulic pressure. Creating pressure beyond rated capacities can result in personal injury.**
- **Before replenishing the oil level, retract the actuator(s) in the system to prevent overfilling the pump reservoir. An overfill may cause personal injury due to excess reservoir pressure created when workholding components are retracted.**

Hydraulic System

- **Do not exceed the rated capacities of any component serviced by this pump. Excess pressure can result in personal injury.**

Air Supply

- **Shut off and disconnect the air supply when the pump is not in use or before breaking any connection in the system.**

PREPARATION & SET-UP

Air Supply Connections

Remove the thread protector from the air inlet of the pump. Select and install the thread fittings that are compatible with your air supply fittings. The pumps air inlet has 1/4 NPT female threads. The air supply should be capable of providing 20 CFM at 100 PSI to obtain the rated hydraulic output. The air filter/regulator/lubricator on this pump will control this pump. Air pressure should be regulated to a maximum of 125 PSI.

Reservoir Venting

Before using the pump, remove the plastic shipping plug from the reservoir fill hole and replace with the breather cap provided.

Hydraulic Connections

Clean area around all oil ports of the pump and actuators. Inspect all threads and fittings for signs of wear or damage and replace as needed. Clean all hose ends, couplers or union ends. Remove the thread protectors from the hydraulic oil outlets. Manually fill the clamps (if so equipped) and hoses with oil. Connect the hose assembly to the hydraulic oil outlet and couple the hose to the cylinder (if so equipped). See Figure 2.

IMPORTANT: Seal all external pipe connections with a high-quality, nonhardening thread sealant. Teflon tape can be used to seal hydraulic connections if only one layer of tape is used.Apply the tape carefully, two threads back, to prevent it from being pinched by the coupler and broken off inside the system. Any loose pieces of tape could travel through the system and obstruct the flow of oil or cause jamming of precision-fit parts.

TYPICAL SINGLE-ACTING CIRCUIT

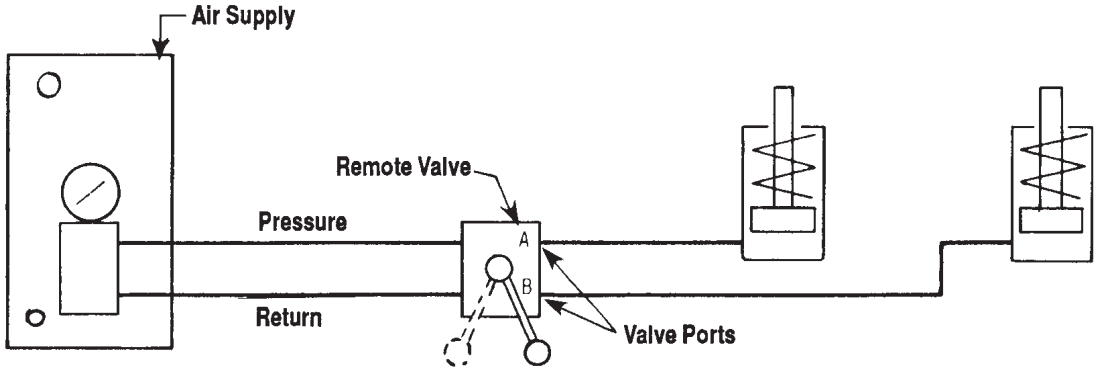


FIGURE 2

1. Connect an oil line from the oil pressure port on the manifold to the pressure port on the valve.
2. Connect an oil line from the oil return port on the manifold to the return port on the valve.
3. Connect the clamp(s) or cylinder(s) to either valve port.
   IMPORTANT: On all single-acting applications, plug one cylinder port and use the other.
   NOTE: By placing the valve in the center position the pump will circulate oil back to the reservoir allowing the pump to prime.

OPERATION

Maximum system pressure is controlled by regulating the air inlet pressure at the pump. As the pump operates, it builds pressure in the system until its maximum pressure is reached and the pump stalls. The pump's stall (maximum) pressure is approximately 25 times the regulated air inlet pressure. The pump operates effectively in a range from 40 PSI to 125 PSI air pressure. This gives it a hydraulic pressure range of 1000 to 3125 PSI. The air pressure required to achieve your desired hydraulic system pressure can be calculated using this 39:1 ratio, but final adjustments should always be made by monitoring hydraulic pressure at the workholding components.

1. Set the air pressure regulator at 0 PSI. Open the air shut-off valve (if so equipped), or connect the air quick coupler (if so equipped).
   NOTE: Under certain curcumstances the pump will need to be primed before operation. Refer to back sheet 2 of 3, section titled "Priming the Pump Unit."
2. Slowly increase the regulated pressure. As air is admitted to the pump unit, it will begin to deliver oil to the system. Continue to slowly turn the air regulator control clockwise until gauge reads approximately 2,500 PSI. A reading of 2,500 PSI should be obtained if the regulated air pressure is approximately 100 PSI.
   NOTE: If air pressure is adequate but the 2,500 PSI hydraulic cannot be reached, follow the procedures outlined in the Trouble-shooting Guide.
3. Cycle the system several times by manually shifting the remote valve. Set the air regulator to the desired clamping pressure. When decreasing pressure, shift the valve after each adjustment to measure actual system pressure.
4. Shut off air supply to the unit, and shift remote valve two times to release all system pressure. Recheck oil level with all actuators retracted. The unit is now ready for operation.

PREVENTIVE MAINTENANCE

NOTE: Any repairs or servicing that requires dismantling the pump must be performed in a dirt-free environment by a qualified service technician.

Lubrication

Set the air line oiler to feed 1 drop of oil per minute to the system. Use SAE grade oil (5W to 30W). For servicing the air regulator, lubricator and filter system, see the operating and service instructions provided.

Bleeding Air from the System

Upon initial startup or after prolonged use, a significant amount of air may accumulate within the hydraulic system. This entrapped air can cause the cylinder to respond slowly or behave in an unstable manner. To remove the air, run the system through several cycles (extending and retracting cylinders) free of any load. **NOTE: The cylinder must be at a lower level than the pump to allow air to be released through the pump reservoir.**

Inspecting the Hydraulic Fluid Level

Check the oil level in the reservoir periodically. The oil level should come to within 1-3/4" of the filler plug (Model D) or to the appropriate mark on the dipstick (Models F & G). Drain, clean and replenish the reservoir with Power Team hydraulic fluid yearly or more often if necessary. The frequency of oil change will depend upon the general working conditions, severity of use and overall cleanliness and care given the pump.

Maintenance Cleaning

1. Keep the outer surface of the pump as free from dirt as possible.
2. Protect all unused couplers.
3. Keep all hose connections free of dirt and grime.
4. Keep the filler/breather cap clean and unobstructed at all times.
5. Equipment connected to the pump must be kept clean.
6. Use only Power Team hydraulic fluids in this pump. Change as recommended.

Note: Shaded areas reflect last revision(s) made to this form.

Draining and Cleaning the Reservoir

IMPORTANT: Clean the pump exterior before the pump interior is removed from the reservoir.

1. Remove the screws that fasten the pump assembly to the reservoir. Remove the pump assembly from the reservoir. Do not damage the gasket, filter or safety valve.
2. Drain the reservoir of all fluid. Refill half full with clean hydraulic fluid.
3. Place the pump assembly back onto the reservoir and secure with two machine screws assembled on opposite corners of the housing.
4. Run the pump for several minutes. Remove the two cover screws and lift off the pump assembly again. Drain and wipe out the reservoir with a clean, lint-free cloth.
5. Fill the reservoir with Power Team hydraulic fluid to within 1-3/4" of the filler plug (Model D) or to the appropriate mark on the dipstick (Models F & G). Place the pump assembly (with gasket) on the reservoir and install the screws. Tighten securely and evenly.

Adding Oil to the Reservoir

1. Acuator(s) must be fully retracted and the air supply disconnected when adding oil to the reservoir.
2. Clean the entire area around the filler/breather cap before removing the filler/breather cap.
3. Use a clean funnel with filter when adding oil.
4. Use only Power Team hydraulic fluids.
5. Fill to within 1-3/4" of the filler plug (Model D) or to the appropriate mark on the dipstick (Models F & G).

Priming the Pump Unit

1. Connect the oil line to the pressure port and keep the return port plugged. Place the other end of the oil line in the pump filler hole.
   NOTE: If the oil lines are connected to a remote valve, shift the valve into the center position and plug both cylinder ports on the valve. This lets oil circulate through the valve and back to the pump reservoir; thereby allowing the pump to prime.
2. Attach air line with shut-off valve to the pump.
3. Open the air valve. Pump will begin to reciprocate, and oil will advance through the hose or oil line and return to the pump reservoir. Allow the pump to cycle approximately 15 seconds.
4. Plug the manifold pressure port, or shift the valve to pressurize the circuit. If the pump builds pressure, it has been successfully primed.

Periodic Cleaning

IMPORTANT: The greatest single cause of failure in hydraulic pumps is dirt. Keep the pump and attached equipment clean to prevent foreign matter from entering the system.

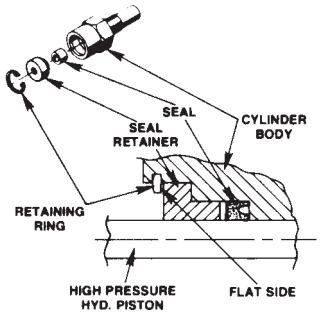
All unused couplers must be sealed with thread protectors. All hose connections must be free of grit and grime. Use only Power Team hydraulic fluid in this unit and change at least once a year.

TROUBLE-SHOOTING GUIDE

Refer to the parts list when using this trouble-shooting guide.

WARNING: To help avoid personal injury,

- **Any repair work or trouble-shooting must be done by qualified personnel familiar with this equipment.**
- **Use the proper gauges and equipment when trouble-shooting.**

PROBLEM	CAUSE	SOLUTION
Pump does not reciprocate or stops reciprocating during operation before reaching stall-out pressure.  NOTE: The Retaining Ring (Part No. 250208) must be installed with the flat side, or sharp edge, placed toward the retainer as shown. **FIGURE 3**	1. Broken return spring or retaining ring. 2. Air piston screws are loose. 3. Sticky shuttle valve (A) Swollen o-ring (B) Swollen bumper (C) Broken spring (D) Excess oil in shuttle chamber 4. Tight air piston (A) Swollen o-rings 5. Air leakage (A) Faulty air piston seals (B) Defective bumper	1. Replace defective part(s) (See Figure 3) 2. Torque to 50/55 in. lbs. 3. (A) Replace o-ring (B) Replace bumper (C) Replace (D) Clean and reseat parts 4. (A) Replace o-rings to reduce friction. 5. (A) Check and replace if defective. (B) Check and replace if defective. Inspect sealing surface.
Pump reciprocates but no oil delivery.	1. Low oil level. 2. Pump not primed. 3. Oil filter contamination.	1. Add oil as instructed in Preventive Maintenance section. 2. Prime pump as instructed in Preventive Maintenance section. 3. Clean filter.
Clamps advance to desired stroke but pump does not build desired hydraulic pressure (air motor running)	1. Oil level too low. 2. Leaky connection or hose.	1. Fill reservoir to within 1-3/4" of the filler plug (Model D) or to the appropriate mark on the dipstick (Models F & G) 2. Tighten connections or replace hose.
Pump will not build to maximum pressure (air motor stopped running)	1. Inadequate air supply. 2. Faulty gauge.	1. Check air supply. Hydraulic pressure will be approximately 25 times the air inlet pressure. 2. Replace gauge.

Note: Shaded areas reflect last revision(s) made to this form.

PROBLEM	CAUSE	SOLUTION
Low oil delivery (cylinder extends slowly)	1. Inadequate air supply.	1. Check air supply -- 20 CFM minumum at 100 PSI is required to achieve full speed.
	2. Contamination in air inlet port.	2. Thoroughly clean air inlet and air side of pump. Clean slot in air cylinder tube completely.
	3. Clogged oil filter.	3. Clean the filter.
	4. Air trapped in hydraulic system.	4. Bleed system of air as instructed in Preventive Maintenance sec.
	5. Inlet ball check is not functioning properly.	5. Reseat or replace ball check.
Pump builds pressure but will not hold pressure.	1. Loose or cross-threaded connections.	1. Check for leakage and re-fit if necessary.
	2. Outlet check ball not sealing properly.	2. Reseat body and/or replace ball.
	3. Defective seals.	3. Replace seals.
	4. Defective 3-way/4-way valve.	4. Replace valve.
	5. Defective clamps.	5. Replace clamps.
Pump will continue to run slowly even after desired pressure is reached.	1. Inlet ball check is not holding.	1. Reseat ball and replace parts if necessary.
	2. Defective 3-way/4-way valve.	2. Replace valve.
	3. Defective clamps.	3. Replace clamps.
	4. Faulty air piston seals.	4. Check and replace if defective.
Excess oil spray from muffler.	1. Air lubricator is set too rich.	1. Adjust.
	2. U-cup seal on high pressure piston is leaking.	2. Replace seal.
	3. Copper washer seal for piston cylinder is leaking.	3. Replace washer and torque piston cylinder to 90/100 ft. lbs. oiled.
	4. Gaskets are leaking.	4. Replace gaskets.